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Effect of foliar application of NAA and Boron on physico-chemical parameters of winter season guava (*Psidium guajava* L.) cv. Lucknow-49

Dipankar Singh Badal and VK Tripathi

Abstract
An experiment was conducted during two subsequent years i.e., 2018-19 and 2019-20 to study the effect of foliar application of NAA and Boron on the physico-chemical parameters of guava cv. Lucknow-49. For this study sixteen treatments *viz*., four levels of each NAA (0, 50, 75, and 100 ppm) and Boron (0, 0.4, 0.6, and 0.8%) and their combinations were used in a Factorial Completely Randomized Design with three replications. Individual application of NAA at 75 ppm not only significantly maximized physical parameters of fruit *viz.*, fruit length (7.00 and 7.12 cm), fruit diameter (7.32 and 7.37 cm), fruit weight (185.42 and 188.83 g), fruit volume (184.47 and 188.45 cc) but also enhanced quality parameters of fruits and recorded highest TSS content (12.28 and 12.35 ºBrix), total sugars (6.55 and 6.64%), TSS/acid ratio 33.34 reducing sugar (4.21 and 4.26%), non-reducing sugar (2.34 and 2.38%), pectin (0.75 and 0.78%) and Vitamin-C content (182.48 and 183.67 mg/100g) with significantly least titratable acidity (0.382 and 0.378%) in guava fruits.
Sprays of 0.6% boron enhanced fruit length (7.09 and 7.24 cm), fruit diameter (7.42 and 7.48 cm), fruit weight (189.80 and 193.91 g), fruit volume (188.32 and 192.75 cc), TSS content (12.50 and 12.56 ºBrix) total sugars (6.49 and 6.58%), TSS/acid ratio (35.1) non-reducing sugar (2.33 and 2.37%), pectin (0.77 and 0.79%) and vitamin-C content (186.02 and 187.35 mg/100g) in guava fruits. Likewise, maximum reducing sugar content (4.23 and 4.29%) and significantly least acidic fruits (0.358 and 0.351%) were obtained with boron 0.8%. In study of N_2 B_2 significantly maximized fruit diameter (7.82 and 7.87 cm), fruit weight (207.24 and 212.20 g), fruit volume (204.08 and 207.98 cc) along with TSS (14.11 and 14.25 ºBrix), total sugar (7.55 and 7.65%), TSS/acid ratio (42.59) reducing sugar (4.71 and 4.76%), non-reducing sugar (2.84 and 2.89%), vitamin-C content (201.98 and 203.16 mg) and significantly minimized acidity content (0.331 and 0.321%).

Keywords: Winter season, guava, NAA, boron, physical parameters of fruit, quality parameters of fruit

Introduction
Guava (*Psidium guajava* L.), which is also known as the apple of tropics or the poor man's fruit, is one of the most exquisite, nutritionally valuable and remunerative crop which is cultivated in many tropical and subtropical countries for its nutritive fruits. It is the hardiest among tropical fruit trees and excels most other fruit crops in productivity and adaptability. But the quality of fruit is poor as it has not received the deserved attention in its cultivation. Plant growth regulators play a significant role in manipulating many physiological phenomenon. Naphthalene acetic acid (NAA) is an important growth regulator of the auxin group, which brings a beneficial change in the quality of many fruits. NAA not only reduces fruit drop but also improves fruit set and quality specially TSS. Micronutrient especially boron plays an important role in the translocation of carbohydrates, auxin synthesis, increased pollen viability and fertilization, ovule development, pollen tube growth, and fruit set. These activities improve the width and length of the fruits which ultimately increases the yield of fruits**.** The work done by early researchers revealed that foliar sprays of boron increased fruit set, reduced fruit drop, and improved the fruit quality in various fruits. It is therefore, necessary to standardize the most optimal level of bio regulator *i.e.,* NAA and micronutrient *i.e.,* boron along with their effective combination for improved quality of guava fruits under the north gangetic plains of the country.

Materials and Methods
The present investigation was carried out at the Horticulture Garden, Department of Fruit Science, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur (U.P.)

during two subsequent years *i.e.,* 2018-19 and 2019-20. The experiment was laid out in Factorial Completely Randomized Design with three replications and sixteen treatments. Four levels of each NAA (0, 50, 75 and 100 ppm) and Boron (0, 0.4, 0.6 and 0.8%) and these combinations were taken. Spraying was done twice *viz.,* before flowering and after fruit set. All the manurial requirements, cultural practices, and plant protection measured were adopted as per norms. Four branches in uniform growth and vigour were selected on each tree of cv L49. The micronutrient (boron) and plant growth regulator (NAA) were sprayed on the tree. Size of fruit was recorded by vernier callipers, weight on an electronic balance, volume by water displacement method and the specific gravity by dividing the weight of fruit with their volume and TSS were determined with the help of a hand refractometer (0 to 32 ºBrix range). The titratable acidity was determined by titrating the fruit sample against 0.1N NaOH using phenolphthalein as an indicator. TSS content percent was divided by acidity per cent to obtain TSS/acidity ratio. Ascorbic acid and sugars were estimated as per A.O.A.C. (1990) [1].

Results and Discussion

Foliar application of NAA and boron significantly improved physical parameters of winter season guava fruits. Among all NAA treatments, maximum fruit length (7.00 and 7.12 cm) showing 15.89% and 10.39% improvement over control, fruit diameter (7.32 and 7.37 cm) exhibiting 13.49% and 13.38% improvement over control, volume of fruit (184.47 and 188.45 cc) displaying 17.83% and 17.66% improvement over control, fruit weight (185.42 and 188.83 g) recording 20.54% and 20.14% improvement over control along with highest specific gravity (1.00 g/cc during both years)was recorded in fruit, which was produced from NAA 75 ppm treated branch during the respective years. Likewise, among all boron treatments, 0.6% boron treated branches produced maximum fruit length (7.09 and 7.24 cm) showing 20.58% and 15.47% improvement over control, fruit diameter (7.42 and 7.48 cm) exhibiting 17.40% and 17.42% improvement over control, volume of fruit (188.32 and 192.75 cc) showing 25.48% and 25.33% improvement over control, fruit weight (189.80 and 193.91 g) displaying 29.84% and 29.95% improvement over control along with maximal specific gravity (1.01 and 1.00 g/cc) during the former and latter year of investigation respectively. The greatest improvement in every physical parameter of guava fruit was noticed under the application of interactive treatment N_2 B_2 wherein NAA and boron interaction significantly influenced fruit diameter, fruit weight, and volume of guava fruit, however, the interaction failed to cause significant variations on the fruit length as well as the specific gravity of guava fruits. These findings are in line with the reports of Shukla *et al.,* (2011) [9], Tiwari *et al.,* (2017) [15], Tripathi *et al.,* (2018) [14] in Aonla, Sharma and Tiwari (2015) [10], Ram *et al.* (2016) [11], Kaur and Kaur (2017) [4], Prajapati *et al.* (2018) [8] and Kumar *et al.* (2019) [5] in guava.

All the quality parameters of guava fruit were positively enhanced by different concentrations of NAA and Boron either alone or in combination. Among all NAA treatments, NAA 75 ppm recorded significantly highest total soluble solids (12.28 and 12.35 ºBrix) showing 19.34% and 19.55% increment over control, TSS/acid ratio (33.34 during both years) displaying 50.11% enhancement over control, vitamin C content (182.48 and 183.67 mg/100g) resulting in 14.49% and 14.89% improvement over control and pectin content (0.75 and 0.78%) exhibiting 20.97% and 21.88% improvement over control along with least acidity content (0.382 and 0.378%) during both the corresponding years *i.e.,* 2018-19 and 2019-20 under investigation. Highest significant improvement in different sugar content of fruits *i.e.,* reducing sugar (4.21 and 4.26%) recording 23.82% and 22.77% improvement over control, non-reducing sugar (2.34 and 2.38%) showing 17.00% and 17.24% increment over control and total sugars (6.55 and 6.64%) recording 21.30% and 20.73% improvement over control, were also noted in the fruits produced with the application of NAA 75 ppm during both the years of investigation. The result of the present investigation are in agreement with the findings of Kumar *et al.,* (2017) [7] in aonla, Abbas *et al.* (2014) [2], Sharma and Tiwari (2015) [10], Dodiya *et al.* (2018) [3], Prajapati *et al.* (2018) [8] in guava.

In the same manner, all the quality parameters of guava were significantly influenced by different concentrations of boron over the control whereas the maximum value for TSS (12.50 and 12.56 ºBrix) exhibiting 24.75% and 24.85% improvement over control, TSS/acid ratio (35.20 during both years) producing 89.45% increment over control, vitamin C content (186.02 and 187.35 mg/100g) recording 20.67% and 20.71% improvement over control, pectin content (0.77 and 0.79%) exhibiting 28.33% and 29.51% improvement over control, non-reducing sugar content (2.33 and 2.37%) showing 17.68% and 17.91% increment over control and total sugars (6.49 and 6.58%) exhibiting 23.38% and 22.76% improvement over control was recorded under the treatment 0.6% boron during first and second years of investigation. However, maximum reducing sugar content (4.23 and 4.29%) recording 28.57% and 28.06% improvement over control along with least acidity content (0.382 and 0.378%) was noted under 0.8% boron concentration during both the years of study. Boric acid being responsible for the improvement of fruit quality as reported in the present study is in accordance with the findings of Kumar and Tripathi (2009) [6] in strawberry, Sharma *et al.* (2011) [12], Trivedi *et al.* (2012) [13] and Waskela *et al.* (2013) [16] in guava.

Table 1: Effect of foliar application of NAA, Boron and their interactions on fruit length (cm) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	4.84	6.16	6.55	6.61	6.04	5.94	6.33	6.73	6.78	6.45
NAA 50 ppm (N_1)	6.03	6.47	6.90	7.10	6.62	6.21	6.60	7.02	7.22	6.76
NAA 75 ppm (N_2)	6.40	6.78	7.50	7.32	7.00	6.51	6.89	7.61	7.45	7.12
NAA 100 ppm (N_3)	6.26	6.71	7.43	7.22	6.90	6.41	6.85	7.57	7.31	7.04
Mean	5.88	6.53	7.09	7.06		6.27	6.67	7.24	7.19	
	N	B	N×B				N	B	N×B	
C.D.	0.376	0.376	N.S.			C.D.	0.166	0.166	N.S.	
S.E. (d)	0.185	0.185	0.369			S.E. (d)	0.081	0.081	0.163	

Table 2: Effect of foliar application of NAA, Boron and their interactions on fruit diameter (cm) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	5.93	6.22	6.79	6.87	6.45	5.99	6.25	6.84	6.91	6.50
NAA 50 ppm (N_1)	6.08	6.74	7.34	7.48	6.91	6.13	6.79	7.39	7.53	6.96
NAA 75 ppm (N_2)	6.67	7.11	7.82	7.67	7.32	6.73	7.17	7.87	7.71	7.37
NAA 100 ppm (N_3)	6.58	6.96	7.75	7.61	7.23	6.64	7.01	7.81	7.65	7.28
Mean	6.32	6.76	7.42	7.41		6.37	6.81	7.48	7.45	
	N	B	N×B				N	B	N×B	
C.D.	0.049	0.049	0.098			C.D.	0.056	0.056	0.112	
S.E. (d)	0.024	0.024	0.048			S.E. (d)	0.028	0.028	0.055	

Table 3: Effect of foliar application of NAA, Boron and their interactions on volume of fruit (cc) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control(B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	141.22	150.12	163.97	170.90	156.55	145.19	154.59	168.44	172.41	160.16
NAA 50 ppm (N_1)	146.30	164.03	185.09	192.15	171.89	150.11	167.82	190.26	194.22	175.60
NAA 75 ppm (N_2)	157.17	180.49	204.08	196.15	184.47	161.62	184.19	207.98	200.02	188.45
NAA 100 ppm (N_3)	155.62	173.87	200.13	190.58	180.05	158.22	177.12	204.33	195.50	183.79
Mean	150.08	167.13	188.32	187.44		153.79	170.93	192.75	190.54	
	N	B	N×B				N	B	N×B	
C.D.	2.583	2.583	5.165			C.D.	2.765	2.765	5.529	
S.E. (d)	1.268	1.268	2.535			S.E. (d)	1.357	1.357	2.714	

Table 4: Effect of foliar application of NAA, Boron and their interactions on fruit weight (g) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	137.23	146.06	163.96	168.05	153.83	139.92	149.06	167.56	172.15	157.18
NAA 50 ppm (N_1)	141.13	160.25	184.08	190.23	168.92	145.05	163.95	187.95	192.29	172.31
NAA 75 ppm (N_2)	155.59	178.83	207.24	200.17	185.42	158.70	182.33	212.20	202.07	188.83
NAA 100 ppm (N_3)	150.77	173.83	203.92	193.83	180.59	153.23	178.26	207.91	196.53	183.98
Mean	146.18	164.74	189.80	188.03		149.22	168.40	193.91	190.76	
	N	B	N×B				N	B	N×B	
C.D.	2.079	2.079	4.158			C.D.	2.204	2.204	4.409	
S.E. (d)	1.020	1.020	2.041			S.E. (d)	1.082	1.082	2.164	

Table 5: Effect of foliar application of NAA, Boron and their interactions on specific gravity of fruit (g/cc) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	0.97	0.97	1.00	0.98	0.98	0.96	0.96	0.99	1.00	0.98
NAA 50 ppm (N_1)	0.96	0.98	0.99	0.99	0.98	0.97	0.98	0.99	0.99	0.98
NAA 75 ppm (N_2)	0.99	0.99	1.01	1.02	1.00	0.98	0.99	1.02	1.01	1.00
NAA 100 ppm (N_3)	0.97	1.00	1.02	1.02	1.00	0.97	1.01	1.02	1.00	1.00
Mean	0.97	0.98	1.01	1.00		0.97	0.98	1.00	1.00	
	N	B	N×B				N	B	N×B	
C.D.	0.015	0.015	N.S.			C.D.	0.017	0.017	N.S.	
S.E. (d)	0.007	0.007	0.014			S.E. (d)	0.008	0.008	0.017	

Table 6: Effect of foliar application of NAA, Boron and their interactions on TSS ^oBrix of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	9.52	10.10	10.73	10.82	10.29	9.56	10.14	10.76	10.85	10.33
NAA 50 ppm (N_1)	9.64	10.67	11.71	12.20	11.06	9.67	10.70	11.74	12.22	11.08
NAA 75 ppm (N_2)	10.56	11.42	14.11	13.04	12.28	10.59	11.44	14.25	13.10	12.35
NAA 100 ppm (N_3)	10.37	11.04	13.44	12.65	11.87	10.41	11.11	13.50	12.71	11.93
Mean	10.02	10.81	12.50	12.18		10.06	10.85	12.56	12.22	
	N	B	N×B				N	B	N×B	
C.D.	0.225	0.225	0.449			C.D.	0.271	0.271	0.542	
S.E. (d)	0.110	0.110	0.221			S.E. (d)	0.133	0.133	0.266	

Table 7: Effect of foliar application of NAA, Boron and their interactions on titratable acidity content (%) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	0.602	0.546	0.406	0.389	0.486	0.594	0.542	0.398	0.382	0.479
NAA 50 ppm (N_1)	0.581	0.424	0.364	0.354	0.431	0.571	0.417	0.368	0.347	0.426

NAA 75 ppm (N_2)	0.483	0.374	0.331	0.340	0.382	0.478	0.377	0.321	0.334	0.378
NAA 100 ppm (N_3)	0.521	0.381	0.335	0.348	0.396	0.512	0.379	0.331	0.342	0.391
Mean	0.547	0.431	0.359	0.358		0.539	0.429	0.354	0.351	
	N	B	N×B				N	B	N×B	
C.D.	0.021	0.021	0.042			C.D.	0.012	0.012	0.024	
S.E. (d)	0.110	0.110	0.221			S.E. (d)	0.006	0.006	0.006	

Table 8: Effect of foliar application of NAA, Boron and their interactions on TSS/acidity ratio of guava cv. L-49

	2018-19					2019-20				
Treatments	Control (B_0)	B_1 (0.4%)	B_2 (0.6%)	B_3 (0.8%)	Mean	Control (B_0)	B_1 (0.4%)	B_2 (0.6%)	B_3 (0.8%)	Mean
Control NAA (N_0)	15.84	18.53	26.52	27.95	22.21	15.84	18.53	26.52	27.95	22.21
NAA 50 ppm (N_1)	16.63	25.04	31.59	34.52	26.94	16.63	25.24	31.59	34.52	27.00
NAA 75 ppm (N_2)	21.86	30.55	42.59	38.35	33.34	21.86	30.55	42.59	38.35	33.34
NAA 100 ppm (N_3)	19.99	28.98	40.12	35.97	31.27	19.99	28.98	40.12	36.31	31.35
Mean	18.58	25.78	35.20	34.20		18.58	25.83	35.20	34.28	
	N	B	N×B				N	B	N×B	
C.D.	1.152	1.152	2.304			C.D.	1.131	1.131	2.262	
S.E. (d)	0.565	0.565	1.131			S.E. (d)	0.555	0.555	1.110	

Table 9: Effect of foliar application of NAA, Boron and their interactions on total sugars (%) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	5.07	5.17	5.62	5.70	5.40	5.13	5.29	5.72	5.81	5.50
NAA 50 ppm (N_1)	5.23	5.52	5.90	6.37	5.76	5.35	5.62	5.98	6.48	5.86
NAA 75 ppm (N_2)	5.41	6.18	7.55	7.05	6.55	5.52	6.26	7.65	7.13	6.64
NAA 100 ppm (N_3)	5.34	5.80	6.90	6.58	6.15	5.43	5.89	6.99	6.69	6.25
Mean	5.26	5.67	6.49	6.42		5.36	5.76	6.58	6.53	
	N	B	N×B				**N**	**B**	**N×B**	
C.D.	0.071	0.071	0.142			**C.D.**	**0.072**	**0.072**	**0.144**	
S.E. (d)	0.035	0.035	0.070			**S.E. (d)**	**0.035**	**0.035**	**0.071**	

Table 10: Effect of foliar application of NAA, Boron and their interactions on reducing sugar (%) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	3.14	3.21	3.54	3.71	3.40	3.19	3.29	3.61	3.78	3.47
NAA 50 ppm (N_1)	3.29	3.47	3.92	4.25	3.73	3.37	3.52	3.96	4.32	3.79
NAA 75 ppm (N_2)	3.38	4.17	4.71	4.58	4.21	3.45	4.22	4.76	4.62	4.26
NAA 100 ppm (N_3)	3.34	3.82	4.48	4.38	4.01	3.40	3.86	4.54	4.44	4.06
Mean	3.29	3.67	4.16	4.23		3.35	3.72	4.22	4.29	
	N	B	N×B				N	B	N×B	
C.D.	0.108	0.108	0.216			C.D.	0.126	0.126	0.252	
S.E. (d)	0.053	0.053	0.106			S.E. (d)	0.062	0.062	0.124	

Table 11: Effect of foliar application of NAA, Boron and their interactions on non-reducing sugar (%) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	1.93	1.96	2.08	1.99	2.00	1.94	2.00	2.11	2.03	2.03
NAA 50 ppm (N_1)	1.94	2.06	1.98	2.11	2.02	1.98	2.10	2.02	2.16	2.07
NAA 75 ppm (N_2)	2.03	2.01	2.84	2.47	2.34	2.08	2.04	2.89	2.51	2.38
NAA 100 ppm (N_3)	2.00	1.98	2.41	2.20	2.15	2.03	2.03	2.45	2.25	2.19
Mean	1.98	2.00	2.33	2.19		2.01	2.04	2.37	2.24	
	N	B	N×B				N	B	N×B	
C.D.	0.060	0.060	0.120			C.D.	0.048	0.048	0.096	
S.E. (d)	0.029	0.029	0.059			S.E. (d)	0.024	0.024	0.047	

Table 12: Effect of foliar application of NAA, Boron and their interactions on pectin (%) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	0.54	0.60	0.68	0.69	0.62	0.55	0.61	0.69	0.71	0.64
NAA 50 ppm (N_1)	0.58	0.66	0.75	0.77	0.69	0.60	0.68	0.76	0.79	0.71
NAA 75 ppm (N_2)	0.64	0.73	0.84	0.80	0.75	0.66	0.75	0.87	0.83	0.78
NAA 100 ppm (N_3)	0.63	0.71	0.82	0.78	0.74	0.64	0.74	0.85	0.80	0.76

Mean	0.60	0.68	0.77	0.76		0.61	0.69	0.79	0.78	
	N	B	N×B				N	B	N×B	
C.D	0.022	0.022	N.S.				0.023	0.023	N.S.	
S.E. (d)	0.011	0.011	0.021				0.011	0.011	0.022	

Table 13: Effect of foliar application of NAA, Boron and their interactions on vitamin C content (mg/l00g) of guava cv. L-49

	2018-19					2019-20				
Treatments	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**	**Control (B_0)**	**B_1 (0.4%)**	**B_2 (0.6%)**	**B_3 (0.8%)**	**Mean**
Control NAA (N_0)	149.30	155.67	165.48	168.06	159.38	150.37	154.38	165.95	168.79	159.87
NAA 50 ppm (N_1)	150.87	162.05	180.82	184.64	169.59	151.84	162.99	182.06	185.73	170.66
NAA 75 ppm (N_2)	159.09	177.05	201.98	191.80	182.48	160.09	178.20	203.16	193.21	183.67
NAA 100 ppm (N_3)	157.33	172.21	196.80	188.38	178.68	158.51	173.39	198.21	189.27	179.84
Mean	154.15	166.74	186.02	183.22		155.21	167.24	187.35	184.25	
	N	B	N×B				N	B	N×B	
C.D.	1.128	1.128	2.257			C.D.	0.692	0.692	1.383	
S.E. (d)	0.554	0.554	1.108			S.E. (d)	0.339	0.339	0.679	

Conclusion

On the basis of results obtained in the present investigation, it is concluded that the doses of NAA (75 ppm) and boron (0.6%) individually or in combination brought about effective enhancement in physico-chemical parameters of guava cv. L-49 fruits. Thus, in view of the above achievement, 75 ppm NAA in conjunction with 0.6% boron may be recommended safely to the guava growers for profitable crop production under the Gangetic plains of north India. The above recommendations if adopted systematically and correctly, possess the potential of improving the economy and prosperity of the country.

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